

CLAIMS

What is claimed is:

1. A parametric audio amplifier system, comprising:

5 at least one amplifier including an input and an output, the amplifier being configured to receive an ultrasonic signal modulated with an audio signal at its input, amplify the modulated ultrasonic signal, and provide the amplified ultrasonic signal to its output;
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at least one acoustic transducer assembly including at least one input, at least one output, a bias generator, at least one acoustic transducer, and at least one component interfacing the amplifier and the acoustic
15 transducer, the input of the acoustic transducer assembly being coupled to the output of the amplifier, the interface component being configured to receive the amplified ultrasonic signal and provide a drive signal corresponding to the ultrasonic signal to the acoustic
20 transducer, the bias generator being configured to generate a bias level and provide the bias level to the acoustic transducer, and the acoustic transducer being configured to receive the drive signal and the bias level, generate a sonic beam corresponding to the drive
25 signal and the bias level, and project the sonic beam through the air to regenerate the audio signal.

2. The parametric audio amplifier system of claim 1 further including a connection interconnecting the

amplifier and the acoustic transducer assembly and configured to carry at least the amplified ultrasonic signal from the amplifier to the acoustic transducer assembly.

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3. The parametric audio amplifier system of claim 1 wherein the interface component comprises a step-up transformer including a primary winding configured to receive the amplified ultrasonic signal and a secondary winding configured to provide the drive signal to the acoustic transducer.

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4. The parametric audio amplifier system of claim 3 wherein an inductance of the secondary winding is resonant with a capacitance of the acoustic transducer at an ultrasonic frequency.

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5. The parametric audio amplifier system of claim 1 wherein the interface component comprises a resonant inductor configured to receive the amplified ultrasonic signal and provide the drive signal to the acoustic transducer.

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6. The parametric audio amplifier system of claim 5 wherein an inductance of the resonant inductor is resonant with a capacitance of the acoustic transducer at an ultrasonic frequency.

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7. The parametric audio amplifier system of claim 1 wherein the bias generator is configured to provide a DC bias voltage level to the acoustic transducer.

5 8. The parametric audio amplifier system of claim 1 wherein the bias generator is configured to provide a low frequency AC bias voltage level to the acoustic transducer.

10 9. The parametric audio amplifier system of claim 1 wherein the ultrasonic signal comprises a source of energy for the bias generator.

15 10. The parametric audio amplifier system of claim 2 wherein the amplifier is disposed in an amplifier assembly, the amplifier assembly further including at least one voltage source configured to generate a voltage level.

20 11. The parametric audio amplifier system of claim 10 wherein the voltage source comprises a DC voltage source configured to generate the voltage level having a level no greater than 50 volts.

25 12. The parametric audio amplifier system of claim 10 wherein the voltage source comprises an AC voltage source configured to generate the voltage level having a level no greater than 50 volts.

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13. The parametric audio amplifier system of claim 10 wherein the connection is further configured to carry the voltage level from the amplifier assembly to the acoustic transducer assembly, and the bias generator is further
5 configured to receive the voltage level as input.

14. The parametric audio amplifier system of claim 10 wherein an output of the amplifier and an output of the voltage source are coupled to a node disposed in the
10 amplifier assembly, the node being configured to provide the amplified ultrasonic signal having the voltage level superimposed thereon.

15. The parametric audio amplifier system of claim 14 wherein the connection is further configured to carry the amplified ultrasonic signal having the voltage level superimposed thereon from the amplifier to the acoustic
15 transducer assembly.

16. The parametric audio amplifier system of claim 15 wherein the acoustic transducer assembly further includes a capacitor coupled between the acoustic transducer and the connection to the amplifier assembly, the capacitor being configured to block the voltage level from the
20 acoustic transducer and provide the amplified ultrasonic signal to the acoustic transducer.
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17. The parametric audio amplifier system of claim 15 wherein the acoustic transducer assembly further includes

a capacitor coupled between the acoustic transducer and the connection to the amplifier assembly, the capacitor being configured to block the bias level from the connection to the amplifier assembly.

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18. The parametric audio amplifier system of claim 15 wherein the acoustic transducer assembly further includes an inductor coupled between the connection to the amplifier assembly and the bias generator, the inductor being configured to block the amplified ultrasonic signal from the bias generator and provide the voltage level to the bias generator.

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19. A method of operating a parametric audio amplifier system, comprising the steps of:

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receiving an ultrasonic signal modulated with an audio signal by an amplifier;

amplifying the modulated ultrasonic signal by the amplifier;

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providing the amplified ultrasonic signal to an acoustic transducer assembly by a connection interconnecting the amplifier and the acoustic transducer assembly;

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receiving the amplified ultrasonic signal by at least one interface component included in the acoustic transducer assembly;

providing a drive signal corresponding to the amplified ultrasonic signal to at least one acoustic

transducer included in the acoustic transducer assembly by the interface component;

providing a bias level to the acoustic transducer by a bias generator included in the acoustic transducer assembly;

receiving the drive signal and the bias level by the acoustic transducer; and

generating a sonic beam corresponding to the drive signal and the bias level by the acoustic transducer.

20. The method of claim 19 wherein the amplifier is disposed in an amplifier assembly, and further including the step of generating a voltage level by a voltage source included in the amplifier assembly.

21. The method of claim 20 wherein the first providing step further includes providing the voltage level to the acoustic transducer assembly by the connection for use by the bias generator included in the acoustic transducer assembly.